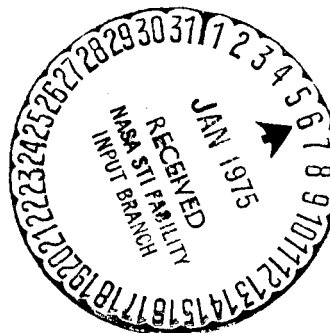SEMI-ANNUAL STATUS REPORT

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AN INVESTIGATION OF THE GALACTIC AND INTERPLANETARY

NIGHT SKY EMISSION AT 6300Å USING DATA FROM OGO-4

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The magnetic tapes containing OGO-4 mirror-position 2, λ6300 data were received from GSFC in several batches over the summer. There was some initial delay in the shipment of useful tapes, as the first shipments from GSFC contained incorrect data. After the programming error had been corrected at GSFC, the OGO-4 tapes were reprocessed and useful tapes were received at the University of Wisconsin.

These tapes were edited, catalogued, and the data were transferred to a significantly smaller number of compacted data tapes for further analysis.

The tapes consist of two distinct types: (1) playback (PB) data, consisting of data stored in the OGO-4 magnetic tape recorder during each complete orbit and played back to a ground station on command, and (2) real-time (RT) data, consisting of short segments of data telemetered from the satellite as it passed over a ground station. A preliminary inspection of the tapes showed that the PB tapes almost always contain the data that is on the RT tapes. Therefore we have not processed the RT tapes beyond the stage described above, and the remainder of our reduction has been done using the PB tapes.

Although OGO-4 completed about 8000 orbits during the useful lifetime of the 6300 photometer, there were only about 1200 orbits of data received from GSFC. This was due to a variety of reasons among which were different operational modes of the spacecraft, noisy data, etc.

We found that the 1200 useful orbits of data received from GSFC were contaminated with "glitches" or unreal signals scattered randomly throughout the data. Therefore the next stage of our data reduction consisted of "deglitching" the orbits. This was done by using the oscilloscope terminal of the computer for a visual display of each orbit of data. The bad data points were erased from each orbit by use of a computer program which involved visual inspection of each orbit and use of a light pen or cursor

to isolate and erase the bad points.

After all the orbits had been "deglitched", they were plotted on the incremental plotter terminal of the computer for further analysis, and xerox copies of the data plots were sent to Edith Reed at GSFC for her inspection.

A casual visual inspection of the plots shows the following:

(1) There are numerous time gaps in the orbital coverage, apparently due to rejection of noisy data by the computers at GSFC. This may cause unavoidable gaps in sky coverage.

(2) The data was usually very noisy and "spiky" when the satellite was over the polar regions of the earth. Apparently auroral $\lambda 6300$ emissions at satellite altitudes and above in high latitude zones is a serious background problem. It may not be possible to use most of the high-latitude data, but we will try to extract useful information from it.

(3) Stars and planets brighterthan about 3rd magnitude can be detected fairly easily by visual inspection of the data. We are now compiling a list of stars and planets which can be so detected and identified. When this list is completed, it will allow us to estimate the contribution to the photometer signal due to fainter, unresolved stars.

In addition to analyzing the individual orbits, of which there are approximately 1200, we have also added the data in groups of orbits in order to smooth the data and also to reduce the amount of numbers to be processed. The computer program which was written to do this sums the data in the specified group of orbits and produces an "added" orbit on an output tape. Data points which deviate from the average by more than a specified number of standard deviations are excluded. This is done by scanning the orbits on the input tape twice. First the program computes the running averages and

standard deviations and then computes an overall average standard deviation

for the group of orbits. It then makes a second pass to throw out "bad"

points and recomputes the running averages which are then put on the output

tape.

By adding the orbits, we have been able to reduce the number of orbits

to about 150. The next step in the analysis will be to construct diagrams

from these added orbits, which will allow us to study selected regions of

the sky in some detail.

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